The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An imaging system for fluorescence endoscopy, comprising:

a light source that produces fluorescence excitation light;

an endoscope that delivers the fluorescence excitation light to tissue under examination in vivo and collects autofluorescence produced by the tissue;

a dual channel fluorescence camera containing a first and second high sensitivity imaging device that receive the autofluorescence in a first and second spectral band and produce electronic signals that are representative of the tissue under examination;

a control center, including an image processing board that receives the electronic signals produced by the dual channel fluorescence camera and said control center causes an image of the tissue under examination to be processed, stored and displayed on a video monitor;

an automatic gain control circuit that determines a distribution of intensity levels in the electronic signals produced by the dual channel fluorescence camera and adjusts a gain of the first and second high sensitivity image device and/or adjusts a light source intensity based on said distribution of the intensity levels such that the relative gain between the two intensified CCD transducers follows substantially a polynomial; and

a video monitor that receives the video signals produced by the image processing board and displays an image of the tissue under examination.

2. The imaging system for fluorescence endoscopy of Claim 1, wherein the automatic gain control circuit comprises:

a plurality of time-over-threshold counters that determine an image area in one or more video fields that have intensities above a plurality of predetermined thresholds.

3. The imaging system for fluorescence endoscopy of Claim 2, wherein the time-over-threshold counters further comprise:

a clock signal having a frequency substantially equal to a pixel clock of the dual channel fluorescence camera;

a gating circuit that passes the clock signal during an active portion of the electronic signals produced by the dual channel fluorescence camera;

a plurality of counters that count pulses of the gated clock signal;

a plurality of comparators having the electronic signals produced by the dual channel fluorescence camera connected to a first input and a programmable reference voltage connected to another input such that when the magnitude of the video signals exceed the reference voltage of the comparator, the comparator produces an output which enables one of the plurality of counters; and

a processor that is programmed to adjust a gain of the high sensitivity imaging device and to adjust the light source intensity such that the distribution of intensity levels in one or more electronic fields substantially equals a desired distribution .

4. The imaging system for fluorescence endoscopy of Claim 1, wherein the light source is programmable to produce fluorescence excitation light or white light, the system further comprising:

a color video camera coupled to receive light collected by the endoscope;

a light path directing mechanism selectively positioned to direct light collected by the endoscope to the dual channel fluorescence camera or to the color video camera;

at least one switch that produces a signal that is indicative of the position of the light path directing mechanism; and

a light source controller that receives the signal from the switch and causes the light source to produce white light after the signal produced by the switch indicates that the light path directing mechanism is positioned to direct the light collected by the endoscope to the color video camera.

5. The imaging system for fluorescence endoscopy of Claim 4, wherein the light source controller causes the light source to stop producing white light and begin producing fluorescence excitation light before the light path directing mechanism is moved from a position where light collected from the endoscope is directed to the color video camera head to a position where light collected from the endoscope is directed to the dual channel fluorescence camera.

6. The imaging system for fluorescence endoscopy of Claim 1, wherein the first high sensitivity imaging device receives autofluorescence in a first spectral band and the second high sensitivity imaging device receives autofluorescence in a second spectral band, the imaging system further comprising a central processing unit that produces a quantitative indication of the intensity of the autofluorescence light in the first spectral band versus the intensity of autofluorescence light in the second spectral band.

7. An imaging system for white light and fluorescence endoscopy, comprising:

a light source that produces white light and fluorescence excitation light;

an endoscope that delivers the light to tissue under examination in vivo and collects reflected light or autofluorescence light produced by the tissue sample;

a fluorescence camera containing a first and second high sensitivity imaging device that receive the autofluorescence in a first and second spectral band and produce electronic signals that are representative of the tissue under examination;

a color video camera that receives the reflected illumination light collected by the endoscope and produces electronic signals that are representative of the tissue under examination;

a control center, including an image processing board, that receives the electronic signals produced by the dual channel fluorescence camera or the color video camera and said control center causes an image of the tissue under examination to be processed, stored and displayed on a video monitor;

a two-part mode switch mechanism including,

i) a light director that is selectively positioned to direct light collected by the endoscope to the fluorescence camera head or to the color video camera head, and

ii) a mechanism that operates to change the light source to produce either fluorescence excitation light or white light according to the position of the light director; and

a video monitor that receives the signals produced by the image processing board and displays an image of the tissue under examination.

8. The imaging system for white light and fluorescence endoscopy of Claim 7, further comprising:

an automatic gain control circuit within the control center that determines a distribution of intensity levels in the electronic signals produced by the first and second high sensitivity imaging devices and adjusts a gain of the high sensitivity imaging devices or adjusts the light source intensity based on said distribution of intensity levels such that the relative gain between the two intensified CCDs follows substantially a polynomial.

9. The imaging system for white light and fluorescence endoscopy of Claim 8, wherein the automatic gain control circuit comprises:

a plurality of time-over-threshold counters that determine an image area in one or more video fields that have intensities above a plurality of predetermined thresholds.

10. The imaging system for white light and fluorescence endoscopy of Claim 9, wherein the time-over-threshold counters further comprise:

a clock signal having a frequency substantially equal to a pixel clock of the intensified CCD transducers;

a gating circuit that passes the clock signal during an active portion of the electronic signals produced by the dual channel fluorescence camera;

a plurality of counters that count pulses of the gated clock signal;

a plurality of comparators having the electronic signals produced by the dual channel fluorescence camera connected to a first input and a programmable reference voltage connected to another input such that when the magnitude of the electronic signals exceed the reference voltage of the comparator, the comparator produces an output which enables one of the plurality of counters; and

a processor that is programmed to adjust a gain of the high sensitivity imaging devices and to adjust the light source intensity such that the distribution of intensity levels in one or more video fields substantially equals a desired distribution.

11. An imaging system for fluorescence endoscopy, comprising:

a light source that produces fluorescence excitation light;

an endoscope that delivers the excitation light to tissue under examination in vivo and collects autofluorescence produced by the tissue sample;

a dual channel fluorescence camera containing a first and second high sensitivity imaging device that receives the autofluorescence light in a first and second spectral band and produces electronic signals that are representative of the tissue sample under examination;

a control center including an image processing board that receives the electronic signals produced by the dual channel fluorescence camera that are representative of the tissue under examination and produces an indication of a relative intensity of the autofluorescence light in each of the first and second spectral band that produces a portion of an image of the tissue; and

a video monitor that displays the video signals to create an image of the tissue under examination.

12. The imaging system for fluorescence endoscopy of Claim 11, wherein the indication of the relative intensity comprises a numeric representation of the relative intensities of the autofluorescence light in each of the first and second spectral bands.

13. The imaging system for fluorescence endoscopy of Claim 12, wherein the indication is displayed on a video monitor.